

## A new design for the CERN to Fréjus neutrino beam

In the framework of the EUROnu design study, we have developed a new design for the CERN to Fréjus neutrino beam based on the proposed linear accelerator SPL. The aim of this beam is to study CP violation in the neutrino sector, with a proton beam of 4.5 GeV/c, a baseline of 130 km and the water Cherenkov MEMPHYS (440 kton fiducial mass) as the far detector.

The main challenge of this project lies with the design of a multi-MW target for the proton beam.

We have fully investigated the design of the target, the target station and the decay tunnel.

We will present the new technical baseline which provides a feasible solution without compromising the physical performance. We will also present the feature of the neutrino beam, the event rates and the sensitivity to  $\sin^2(2\theta_{13})$  and to the CP-violating phase  $\delta$ .

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